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Monthly Report on the Uranium Market

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MONTHLY REPORT ON THE URANIUM MARKET

February 1982 No. 162

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URANIUM MARKET
Pricing 1
1981 Transactions 1
Africa 2
Australia 3
Canada 4
Europe 4
Far East 5
South America 6
United States 7

MARKET DATA
Uranium Supply 8
Available for Sale
Available for Loan
Uranium Demand 9
Inquiries to Purchase
Inquiries to Borrow
Conversion Supply and Demand 10
Current Transactions 11

MARKET ANALYSIS
Uranium Production in 1981 12
Washington Public Power Supply System 13
Quantitative Factors Affecting Uranium Prices 13

ESSAY
Uranium Prices and Long-term Contracts 19

RAW MATERIALS
Shootaring Canyon Project 22

STATISTICAL DATA
Exchange and Transaction Values 28
Conversion Value 3
Loan Use Charge Rate 31
Historical Loan Use Charge Rate 32
Optimum Tails Assay 35
Government Statistics 36

INDEX 40

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URANIUM MARKET

PRICING

The **Exchange Value** as of January 31, 1982 is $23.00 per pound U_3O_8, a drop of fifty cents from the $23.50 level that held for the past six months. This decrease reflects the following factors:

1. Recent transactions concluded at lower price levels.
2. Lower prices being negotiated in pending transactions.
3. An increase in the amount of material available for sale in the near term.
4. Buyers' and sellers' perceptions that recent cancellations and deferrals of reactors will make available, for sale in the near term, additional large quantities of inventory.

Aware of these developments and sensing a weakening market, buyers became increasingly selective, particularly in the spot and near-term markets. Some buyers who had been active in the market delayed their purchasing, presumably until the downward momentum slows. At the same time, sellers trying to anticipate the trend entered the market with substantial quantities of material. The *Market Data* section of this Report indicates that material available for sale in the spot and near-term market (deliveries completed within one year) totals 10.1 million pounds U_3O_8 while uranium demand for the same time period totals 4.0 million pounds U_3O_8.

Any strengthening of prices in the spot market in either current or constant dollars, must await clearing of the inventory overhang that already exists. If, as expected, the inventory overhang worsens, it will exert even more persistent downward pressure on prices in the spot and near-term markets. However, prices in the spot and near-term markets are diverging from those of the intermediate and long-term markets. Utility invitations for five- to ten-year supplies (typically beginning in the 1983-1985 time period) are unlikely to evoke sales offers at prices related to current spot market levels. To the extent that the price differential exceeds inventory carrying costs, it is possible, as in the past, that some buyers may elect to buy and hold inventory as opposed to contracting longer term. Such early procurement would, of course, tend to strengthen spot prices.

The **Transaction Value** as of January 31, 1982 is $24.00 per pound U_3O_8, unchanged from last month. This month's Transaction Value includes twenty transactions totaling 2.8 million pounds U_3O_8 and covers a period of five months.

There are three uranium sales transactions reported this month:

1. A US firm sold between 100 thousand and 300 thousand pounds U_3O_8 to a US intermediary firm for delivery in the first half of this year.
2. A US producer sold 100 thousand to 300 thousand pounds U_3O_8 to a US firm, with delivery taking place in 1982.
3. A US utility sold 100 thousand to 300 thousand pounds U_3O_8 to another US utility, for delivery this year.

In the secondary conversion market, one US utility sold between 300 thousand and 600 thousand pounds U as UF_6 to another US utility. Delivery is to take place in the first half of this year.

The **Loan Use Charge Rate** remained at six percent. The *Statistical Data* section of this Report contains a table listing the Loan Use Charge Rate for all past Nuexco Reports.

The **Conversion Value** as of January 31, 1982 is $1.20 per pound U as UF_6, unchanged from last month. The secondary market for conversion services was quiet during January. One transaction closed at a price approximately equal to Conversion Value.

1981 Transactions

During 1981, Nuexco reported 52 uranium sales transactions; they involved a total of 54.4 million pounds U_3O_8, equivalent. Of that amount, 46.2 million pounds U_3O_8 were included in intermediate or long-term transactions (deliveries more than one year into the future). During 1981, Nuexco reported seven transactions that used some form of a market-related pricing mechanism; they involved a total of 10.4 million pounds U_3O_8. The annual totals of all transactions are tabulated below in Table 1.

Table 1

1981 TRANSACTIONS REPORTED BY NUEXCO, TOTALS BY YEAR
(millions of pounds U_3O_8)

Year	Amount	Year	Amount
1981	6.2	1986	5.0
1982	2.9	1987	3.6
1983	3.7	1988	3.4
1984	4.8	1989	2.7
1985	3.7	1990+	18.4

Thirty of the transactions reported by Nuexco during 1981 met the tests for inclusion in one or more of the

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URANIUM MARKET

Transaction Value calculations. Those transactions involved a total of 5.6 million pounds. The weighted average of prices paid in those thirty transactions equals $24.35.

It is important to note that the weighted average mentioned here is not an average of Transaction Values. Some 1980 transactions were included in some of the early 1981 Transaction Values. Also, not all transactions are included the same number of times during the year; some might be in only three Transaction Value calculations and others might be included in four to six, depending on how many pounds are necessary to meet the minimum of two million pounds for each Transaction Value.

AFRICA

In a year end review of the uranium market, Messrs. G. Langton and D.A. Etheredge, senior officials of Anglo-American, commented as follows:

"The uranium market continued to weaken during the year. This was partly a result of the ongoing enforced inventory liquidation by US electric utility companies in a market already weakened by perceptions of projected oversupply.

"As a result, a number of higher-cost uranium producers, particularly in the US, which represented a significant proportion of world production, have become uneconomic and been forced to curtail or cease their operations. In addition, a number of new projects have been deferred or canceled. It will require a considerable price increase before these production facilities will be utilized.

"Nevertheless, despite the consequent shortening of the period until projected supply and consumption are again in balance, lead times for new nuclear reactors remain long and it will probably be several years before any real price improvement is seen."

The tone of their comments is interesting when compared with the more optimistic views offered by other officials, particularly those associated with prospective entrants into the uranium business. They typically see a resurgence of nuclear power leading to excellent market prospects.

Final 1981 uranium production figures from South African gold-uranium operations (members of the Chamber of Mines) were released this month and are presented in Table 2. It also presents the corresponding figures for each quarter of the year.

Table 2

REPUBLIC OF SOUTH AFRICA:
1981 URANIUM PRODUCTION FROM GOLD-URANIUM OPERATIONS
(thousands of pounds U_3O_8)

Operation	1Q81	2Q81	3Q81	4Q81	Total
Blyvooruitzicht	178	188	173	157	696
Buffelsfontein	339	363	337	354	1,393
CHEMWES	380	363	372	358	1,473
ERGO	162	181	168	155	666
Harmony	308	323	336	312	1,279
Hartebeestfontein	304	269	241	241	1,055
J.M.S.	609	584	603	614	2,410
Randfontein	361	325	341	278	1,305
Vaal Reefs	993	923	957	860	3,733
West Dreifontein	135	131	141	127	534
West Rand Consolidated	188	179	53	54	484
Western Deep Levels	108	130	130	101	469
TOTAL	4,065	3,959	3,852	3,621	15,497

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URANIUM MARKET

Some observations about the figures in Table 1 and about 1981 uranium operations:

1. Fourth quarter production was approximately eight percent less than that of the third quarter.
2. 1981 production was approximately two percent less than that of 1980.
3. Production at Randfontein's millsite uranium plant ceased during the fourth quarter.
4. Commissioning of the new Western Areas uranium plant began during December and initial production took place during January.
5. Table 1 includes all of South Africa's uranium production except that of Palabora, which is not a member of the Chamber of Mines. That figure is scheduled to be released in a few months.
6. The Beisa Mines section of St. Helena commenced stoping operations during September; limited quantities of uranium and gold have been recovered to date.

AUSTRALIA

Pancontinental Mining Ltd. resumed its negotiations with the Northern Land Council after a holiday break. The current round of talks is based on agreements reached between Pan Con and the Aboriginal representatives during previous discussions. It is understood that many of the outstanding issues are being resolved in favor of the traditional owners. The outcome of these negotiations will indicate the terms under which other uranium developments on Aboriginal land in the Northern Territory will proceed, especially Denison Mines' Koongarra deposit.

Following the completion of environmental procedures and compliance with Australia's foreign investment policy, the federal government approved the development of the Lake Way uranium project in Western Australia. Lake Way is a joint venture between Vam Ltd., an oil and gas producer (46.5 percent), and Delhi Petroleum Pty., Ltd. (53.5 percent), a wholly-owned subsidiary of CSR, Ltd. CSR controls the Honeymoon project in South Australia and holds significant exploration lands north of the Nabarlek uranium mill site. CSR is also a member of the Uranium Enrichment Group of Australia (UEGA). Having received development approval, the Lake Way partners are now entitled to seek ministerial authority to negotiate sales contracts.

After three and a half years of negotiations, officials of the Australian and Japanese governments initialled a bilateral safeguards agreement during January. Japan regards the agreement with Australia as significant, inasmuch as it will form the basis of Japan's upcoming negotiations with the US and Canada.

The safeguards package must be ratified in Japan by the Diet, but it is not subject to Parliament approval in Australia. Japanese reports claim that Japan has obtained important concessions from Australia:

1. Waiver of the requirements for prior approval by Australia for the transfer of nuclear material to third countries.
2. Removal of the requirement for prior approval to reprocess Australian uranium. It would be replaced by a requirement to notify the Australian government of the plants where the uranium will be reprocessed.
3. Waiver of the requirement of prior approval for enrichment above 20 percent U_{235}.

The Australian government, however, has denied Japanese reports of the concessions. Resolution of the conflicting versions must await the publication of the safeguards package.

Australia has also reached agreement with Switzerland on the text of the bilateral agreement between the two countries. Ratification by the parliaments of both sides is anticipated in 1982. Unlike the Japanese, the Swiss do not currently hold supply contracts for Australian uranium, so ratification of the agreement is not a pressing matter.

UEGA's selection of an enrichment technology, expected by the end of 1981, has been postponed until March or April of 1982 due to a last-minute decision by the US government to make its gas centrifuge technology available to Australia. UEGA plans to commence a full feasibility study, at a cost of $5 million, on the establishment of a uranium enrichment industry in Australia immediately following the technology selection. The feasibility study will take two years to complete.

Until the decision is made, UEGA will evaluate the centrifuge technologies of Japan, Urenco, and the US, along with the French chemical exchange technology. Unofficial reports indicate that UEGA favors Urenco as a technology partner for several reasons:

1. Urenco's proven technology is probably cheaper than the alternatives.
2. Local manufacturing of centrifuges will be allowed.
3. Urenco has developed a strong relationship with

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UEGA over the past two years.

4. Urenco centrifuges are smaller and easier to build than the US equivalent.

5. Japanese technology is still in the pilot stage.

Regardless of the choice of technology, it is likely that UEGA will seek both French and Japanese participation to encourage the involvement of major consumer nations in the project. Plant size is still tentative. It will ultimately depend on market commitments, but figures of 1-3 million SWU per year are being considered. UEGA will almost certainly take a modular approach to capacity additions.

After selecting the technology, the most important decision will be the siting of the plant. In addition to the Northern Territory, Western Australia, South Australia and Queensland are potential contenders. At this juncture, conditions seem to favor a South Australian site, but the situation is quite fluid. To generate a favorable climate for the enrichment industry in that state, the South Australian government is participating in a study by two local companies in conjunction with British Nuclear Fuels, to determine the feasibility of an independent conversion plant in South Australia. This study proceeds in parallel with, and independent of, any efforts which UEGA is undertaking concerning UF_6 conversion.

The overlapping spheres of responsibility between government (federal and state) and industry create a complex web of political and commercial demands which the decision process of the feasibility study will seek to satisfy. The study will continue through 1984. Taking into account present market conditions and the absence of licensing procedures in Australia, a commitment to construction could hardly emerge before 1986; consequently, operations could hardly commence before 1990.

CANADA

Now that a half-dozen or so new uranium sales contracts have been approved by the Canadian Uranium Export Review Panel, it is possible to piece together what appears to be some of the current guidelines for buying U_3O_8 from Canada.

The guidelines are not established by legislation. Canadian producers receive informal guidance on contract terms prior to submission of a proposal to sell. After a contract is signed, it is submitted to the Panel for formal review and approval. Since contracting guidelines are informal, they are also subject to change. There is no *guarantee* that because a certain provision received approval in a prior contract it will receive approval in a future contract. This coordination process between industry and government seems to be working well and allows the government to keep its options open.

From contracts already approved, it can be inferred that:

1. Uranium can be sold at firm or escalated prices for delivery over the next few years.

2. Long-term offers can be made for delivery into the early 1990's on a market price basis. A floor price is mandatory. Occasionally, deliveries can extend beyond the 1990's.

3. Exemptions to the policy of upgrading material to UF_6 prior to export will be granted if there is a reasonable basis for doing so. The reasons might include buyers with existing conversion contracts, or non-competitive offers from Eldorado.

In the past, it was apparently possible to receive authorization to export U_3O_8 (rather than UF_6) as many as eight to ten years into the future. Now such exemptions will be granted only three or four years into the future. This change in the informal guidelines has occurred over the last several months and may be related to Eldorado's plan for capacity expansion.

Eldorado's UF_6 conversion capacity has been full recently, but a major expansion is underway. With Eldorado at full capacity, exceptions to the upgrading policy did not pose a problem. Now that Eldorado will have additional capacity, the Canadian government is maintaining its options by limiting the length of time for which an exemption initially will be granted.

EUROPE

Nuclear power's share of electricity production in **France** rose to 37.7 percent from 23.5 percent in 1980, according to provisional figures for 1981 published by Electricite de France (EdF). EdF attributed a 3.8 percent increase in total French electricity consumption almost entirely to additional consumption by Eurodif's enrichment plant.

In **Great Britain**, the cabinet announced on January 20 that it has delayed the start of the public inquiry to examine plans to build Sizewell B, Britain's first PWR, from the fall of 1982 to January 1983. The timetable was revised to give witnesses at least six months to examine the documents prior to the inquiry. The start of

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construction, which had been expected in 1983, is now planned for the spring of 1984. Senior ministers in the government fear that the plant could become an election issue. The extra safety precautions, including four rather than two independent emergency core cooling systems, will increase the plant's cost by about 20 percent, but power from Sizewell B should be 30 percent cheaper than that from an AGR.

According to l'Union Belge des Exploitations Electriques, 21.6 percent of **Belgium's** electricity production in 1981 came from nuclear power. This percentage will rise to more than 40 percent after Doel Unit 3 and Tihange Unit 2, each 900 MWe, come into service in 1982. These units are two of the four reactors currently under construction in Belgium. The other two, 1,000 MWe each, are planned for operation in mid-1984.

The third 1,000 MWe block at the nuclear station Tschernobyl in the Ukraine, **USSR** will be on line for the first time "shortly" (as stated in a December 1981 report from the area). The unit is a PWR of the RBMK type. The first two units have been in operation since 1977 and 1978 respectively. Three more similar units are planned for the station.

Eventually the station may be increased to about 12,000 MWe, which would include four 1,500 MWe size units. A 750 KV transmission line is being built to carry the power from Tschernobyl to Winniza where it will connect to already existing lines to transfer the power to Albertirsa in central Hungary. From Hungary, the power will eventually go to Austria and other west European countries.

In December 1981, the USSR nuclear plant Rovno Unit 2 was connected to the distribution grid. This plant is a 440 MWe PWR. The Rovno site is reported to be near the sites containing the Leningrad and Tschernobyl units.

In late December 1981, the research reactor FR2 at the Karlsruhe, **West Germany** nuclear research center was shut down permanently after more than 20 years of operation. The start-up of West Germany's newest nuclear power plant, Grafenrheinfeld, is progressing well. Plant operating level is now at 30 percent. It is expected to reach full power output of 1,300 MWe within the next few weeks.

In **Sweden**, the Ringhals Unit 3 plant has been shut down since last fall as a result of vibration problems in the steam generator. The Swedish State Power Board has proposed to limit operations to 50 percent of the nominal output pending permanent corrective action, but so far the regulatory authorities have not approved the proposal. As a result of the loss of this generating capacity and the extreme winter conditions, Sweden has had to depend on operation of costly oil fired peaking units to meet power demands.

In **Italy**, the Caorso plant continues to operate well. In keeping with the government approved nuclear power program to build three more units, three regions have been designated as locations for the units. The three areas include one near Milano, one near Torina and one in the extreme southeast part of Italy. The government has requested local authorities to recommend specific sites within those regions by May 1982.

The Chancellor of **Austria**, Mr. Kreisky, stated at a recent political meeting that he and his Socialist Party will support efforts in the next two years to eventually put Tullnerfeld into operation. He added that, if reelected in 1983, he will bring the issue to a formal vote once again.

On the other hand, the Free Democratic Party has said they never will support operation of the plant. Thus, the key factor will be the position of the third party, the People's Party. The People's Party position is that they would not support startup of Tullnerfeld until the radioactive waste disposal problem is resolved to their satisfaction. The US may be asked by the Socialists and the People's Party to help solve the waste issue by agreeing to take Austrian waste for disposal in the US. In return, Austria would start up Tullnerfeld and so would not have to import gas from the USSR.

In **Switzerland**, enough signatures have been obtained on a petition to allow for a referendum preventing any new nuclear power plants from being built, including Kaiseraugst. It could take up to two years to organize the referendum, so it is likely Kaiseraugst will be postponed for that amount of time.

FAR EAST

Japan's Ministry of International Trade and Industry (MITI) is preparing to lower its official target for installed nuclear power generating capacity in 1990. The present official target of 51,000 to 53,000 MWe, established in January 1981, will be reduced by more than twenty percent, to 40,000 to 50,000 MWe. Given current siting and licensing constraints, even the lower end of the

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new range seems optimistic.

Notwithstanding these revisions, Japan continues to make steady progress in its nuclear program. In line with previous forecasts (Nuexco Report 158), Chubu Electric Co. has placed the order for its Hamaoka Unit 3, and anticipates the unit will begin service by 1986. Similarly, Shikoku's Ikata Unit 3 is now scheduled for 1988 operation.

A portion of the Japanese government program aimed at reducing its trade surplus with the US and Europe calls for the importing and stockpiling of various metals and minerals. The absence of uranium from the list of items to be stockpiled is a clear indication that the Japanese government views the nation's current uranium situation as comfortable.

Kansai Electric Power Co., Shikoku Electric Power Co. and Kyushu Electric Power Co., the Japanese shareholders (and customers) of Energy Resources of Australia (ERA, the Ranger Project) will not stockpile their U_3O_8 output from the project; instead, they will have it delivered to overseas conversion facilities. This decision was dictated mainly by existing conversion commitments, but concern over shipping strikes and other work stoppages also played a role.

SOUTH AMERICA

Despite continuing financial problems, **Argentina** is moving ahead with its commitment to nuclear power. Concrete to house the country's third nuclear power plant, the 692 MWe Atucha II, was poured in late 1981. The unit, located in the province of Buenos Aires, very near the site of Atucha I, is scheduled for operation in 1987.

The financial problems of Argentina's Comision Nacional de Energia Atomica (CNEA) stem in part from peso devaluations which affected the working capital of the organization. Also, Argentina's President Viola was replaced before he had provided the CNEA with funds pledged last June. The CNEA has been lobbying for a budget increase from the Argentina government to speed up payments to CNEA suppliers.

Like Argentina's two other nuclear units, Atucha II is a pressurized heavy water reactor (PHWR), which burns natural uranium and uses a heavy water moderator. The two units are the 342 MWe Atucha I plant, which has been operational since 1974, and the 600 MWe Embalse plant which is now scheduled to go into service in 1983. Although the Embalse and Atucha II plants are continuing on schedule, the CNEA financial situation clouds the future of the additional plants scheduled under Argentina's nuclear program. Argentina's choice of the PHWR technology has allowed it to pursue its nuclear development relatively unhampered by its inability to reach agreement with the US on certain nonproliferation matters.

The Atucha II project, unlike its two predecessors, will have considerable local involvement in all phases of its development. The Argentine Nuclear Electrical Power Stations Co. Ltd. (ENACE S.A.) was created expressly to manage the project. It is owned 75 percent by the CNEA and 25 percent by the German company Kraftwerk Union A.G., the supplier of Atucha II.

Atucha II will differ also in its use of domestically produced fuel and moderator. Despite problems with the new Sierra Pintada mine, Argentina is capable of producing sufficient uranium to support its nuclear program, even after having lent some 500,000 pounds U_3O_8 to Brazil. All of Argentina's uranium concentrate comes from four properties; three use the heap-leach recovery method and one is conventional. Total capacity is approximately 500 thousand pounds U_3O_8 per year.

In addition to the four operating properties, two projects are under development by private contractors. The La Estela project in San Louis Province is scheduled to begin production this year at a rate of approximately 50 thousand pounds U_3O_8 per year; the Los Gigantes project in Cordoba Province is to have an annual production capacity of approximately 200 thousand pounds U_3O_8. The start-up date of the latter project is uncertain at this time. The heap leach recovery method will be used at both projects.

Completion of the La Estela and Los Gigantes projects would increase Argentina's annual production capacity to approximately one million pounds U_3O_8. However, of the four centers now in production, all but one are being phased out due to lack of ore reserves. Originally all four production centers were scheduled to phase-out with the start-up of the Sierra Pintada project about mid-1983. Sierra Pintada will not be in production as scheduled; therefore, the projects under development most likely will serve to maintain production capacity at approximately the current level.

CNEA reports reasonably assured uranium reserves for the country of 30,000 metric tons U_3O_8. To enable annual production to continue to exceed annual requirements, CNEA has proposed the immediate development of two deposits in the Sierra Pintada district. Annual

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production capacity from the two deposits could reach one million pounds U_3O_8 within four to five years after start of construction, but the start of production from the two deposits could be delayed until 1986. If so, the CNEA plan to export surplus U_3O_8 during the mid to late 1980's would be jeopardized; all production would probably be reserved for domestic use.

According to **Brazil's** nuclear power agency Nuclebras, recovery of uranium concentrate by the country's first yellowcake plant began in December, 1981. Regular operation is scheduled for the first quarter of 1982 with the completion of three months of tests.

UNITED STATES

The contraction of the US uranium production sector continued during January. The following is a list of recent announcements of cutbacks and shutdowns.

1. Atlas Minerals will lay off about 34 percent of the workforce at Moab.
2. Exxon Nuclear Corp. will be closing altogether its Highland underground mine in Wyoming, but will continue to run the mill at a reduced level.
3. Exxon's Felder mine in south Texas is scheduled to close in mid-1982.
4. Mining at the Midrite Mine (51 percent Newmont Mining Corp. and 49 percent Dawn Mining Co.) on the Spokane Indian Reservation has ceased and may not resume in 1982 unless market conditions improve.
5. Mining and milling at Western Nuclear Inc.'s Sherwood site, also located on the Spokane reservation, will continue, but at a reduced level.

Rochester Gas & Electric's Ginna unit was shut down on January 25 following a loss of primary coolant. The incident began when a leak at the plant's steam generator tubes allowed a small amount of primary coolant to escape to the secondary system and thence, to the atmosphere. In accordance with procedure, operators briefly opened the pressurizer relief valve to reduce primary system pressure and thus, the leakage rate. When they repeated the procedure, the relief valve failed to open. Officials of Rochester Gas & Electric at first estimated that 5,000 to 10,000 gallons of radioactive water escaped into the containment building before operators could shut the back-up valve. A subsequent inspection of the containment building indicated that the original estimates had been too high.

The rapid loss of pressure at normal operating temperature caused a steam bubble to form at the top of the reactor vessel. Operators acted promptly to stop the loss of coolant, raise pressure and collapse the steam bubble. The plant could be running at full power again within a few weeks.

The New Hampshire Public Utilities Commission directed that Public Service of New Hampshire reduce its interest in the Seabrook plant to 25 percent from the current 35 percent within six months. Without the reduction, the Commission will consider regulatory measures to delay or cancel Seabrook Unit 2. The Commission deemed the action necessary to maintain the financial health of the utility. Both major bond rating services, Moody's and Standard & Poor's, immediately downgraded the utility's bonds. Consequently, the Commission's actions worsened, at least for the short term, the financial health they ostensibly were trying to preserve. The Commission reacted by "forbidding" further financing of Seabrook 2.

Washington Public Power Supply System (WPPSS) announced a plan for "controlled termination" of WNP Units 4 and 5 after the financial scheme to mothball the two units for two years and defer construction costs was scrapped by the 88 participants in the project. This termination could add more than $800 million to the cost of the twin units 1 and 3. The background of this event is discussed in the *Market Analysis* section of this Report.

A TVA staff report indicates that demand for electricity in TVA's service area will not grow enough to justify completion of the three nuclear plants the utility still has under construction. Thus, it is likely that the TVA Board of Directors will defer indefinitely the two Hartsville projects and one at Yellow Creek when it meets February 3, 1982.

On the brighter side, Southern California Edison's San Onofre Unit 2 was licensed for fuel loading and low power testing by the NRC last month. Additional approvals for full power generation are expected within a few weeks.

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MARKET DATA

Market Opportunities are *active* inquiries in the uranium market to buy, sell, borrow or lend. The data presented in this section are in no way intended to be indicative of the entire uranium market for the time period covered.

URANIUM SUPPLY

Nuexco Reference Number	Delivery Periods* (Thousands of Pounds U_3O_8) 0 to 1 Year	1 to 2 Years	2 to 5 Years	Remarks
Available for Sale:				
1475	1,000			UF_6
1490	1,000			
1575			500	Long Term
1581	150	150	150	Long Term
1584	1,000			
1600	250	250	250	Long Term
1610	200			
1637	1,000			
1684	500			UF_6
1738	750			UF_6
1749	350	200	200	
1769A	110			UF_6
1770	350			
1774	50			
1804	615			
1805	500	500	500	Long Term
1807	700			
1810		750		
1814	250			
1818		250	250	Long Term
1824	20			
1812A	1,000			
1867	10			
1872	250			
1877	50			
TOTAL:	10,105	2,100	1,850	
Available for Loan:				
1695	225	325	325	UF_6
1742	200			
1785	1,000			
1815	1,000			UF_6
1884	275			
TOTAL:	2,700	325	325	

***Measured from the date of this Report.**

MARKET DATA

Market Opportunities are *active* inquiries in the uranium market to buy, sell, borrow or lend. The data presented in this section are in no way intended to be indicative of the entire uranium market for the time period covered.

URANIUM DEMAND

Nuexco Reference Number	Delivery Period* (Thousands of Pounds U_3O_8)			Remarks
	0 to 1 Year	1 to 2 Years	2 to 5 Years	
Inquiries to Purchase:				
1410		1,500	1,500	
1459			200	Long Term
1603			100	Long Term
1634		400		
1699	650	550	250	
1724	650	500	500	Long Term
1732	50			
1744	1,000			
1775	20			
1868	300	200	200	Long Term
1874	1,000			
1875	350	350		
TOTAL:	4,020	3,500	2,750	
Inquiries to Borrow:				
1621	300			
1780	500			
1812	1,000			
TOTAL:	1,800			

***Measured from the date of this Report.**

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MARKET DATA

Market Opportunities are *active* inquiries in the secondary market for UF_6 conversion services. The data presented in this section are in no way intended to be indicative of the entire market for the time period covered.

CONVERSION SUPPLY

Nuexco Reference Number	Delivery Period* (Thousands of Pounds U as UF_6) 0 to 1 Year	1 to 2 Years	2 to 5 Years	Remarks
1451	75			
1584		300	300	Long Term
1607	850			
1609	500	1,500	1,000	Long Term
1619		250	50	
1661	200			
1684	450			
1764	100			
1840	200			
TOTAL:	2,375	2,050	1,350	

CONVERSION DEMAND

Nuexco Reference Number	Delivery Period* (Thousands of Pounds U as UF_6) 0 to 1 Year	1 to 2 Years	2 to 5 Years	Remarks
1594		400	950	Long Term
1622	500	900		
TOTAL:	500	1,300	950	

*Measured from the date of this Report.

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MARKET DATA

CURRENT TRANSACTIONS*

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller Group	Buyer Group	Remarks
1681	82	101-300	104	US	US	
1695	82	101-300	—	US	US	Definitive price info not available
1696	82	101-300	101	US	US	

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller Group	Buyer Group	Remarks
1708	82	301-600	100	US	US	

*Transactions listed include not only those in which Nuexco was involved, but also all others of which Nuexco is aware.

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URANIUM PRODUCTION IN 1981

Nuexco's estimate of 1981 uranium production for the major producing regions is presented in Table 3; 1980 production figures are shown for comparison.

Table 3

WORLD URANIUM PRODUCTION
(millions of pounds U_3O_8)

	1980 (Actual)	1981 (Estimated)	Percent Change
US	42.5	36.7	-14
Australia	3.9	8.1	+108
Canada	18.7	20.1	+7
Republic of South Africa	15.7	15.9	+1
Other Africa	23.4	23.5	negligible
France	5.6	5.8	+4
Other	1.0	1.5	+50
TOTAL	110.8	111.6	+1

Total uranium production in 1981 was essentially the same as in 1980, but its distribution among the major producing regions changed somewhat. During 1981, lower cost production from Australia and Canada began to displace higher cost US production; increased output from Australia and Canada almost exactly offset the 14 percent decline in US uranium output.

Within the US, the distribution of uranium production among the states shifted noticeably, as shown in Table 4. Essentially all of the reduction was due to closings and production cutbacks in conventional operations in Wyoming and New Mexico. In-situ leach and by-product operations fared somewhat better in the weakened market environment that prevailed throughout 1981.

Nuexco had anticipated a decline in US production in 1980 in response to the contraction of the US nuclear program and declining uranium prices. That decline developed surprisingly slowly (1980 production actually increased 13 percent to 42.5 million pounds) and did not become evident until 1981.

Table 5 shows Nuexco's forecast that 1982 production will decline further to 28.2 million pounds in 1982. That amount will represent a 23 percent reduction from 1981. As in 1981, New Mexico and Wyoming and conventional mining operations will show the greatest declines, but some in-situ leach operations will be curtailed as well.

Table 4

US URANIUM PRODUCTION
(millions of pounds U_3O_8)

Mill Location	1980 (Actual)	1981 (Estimated)	Percent Change
New Mexico	14.9	12.2	-18
Wyoming	12.1	8.4	-31
Texas	6.4	5.3	-17
Utah	3.6	4.9	+36
Others	5.5	5.9	+7
TOTAL	42.5	36.7	-14

Table 5

US URANIUM PRODUCTION
(millions of pounds U_3O_8)

Mill Location	1981 (Estimated)	1982 (Forecast)	Percent Change
New Mexico	12.2	8.1	-34
Wyoming	8.4	6.3	-25
Texas	5.3	4.8	-9
Utah	4.9	3.3	-33
Others	5.9	5.7	-3
TOTAL	36.7	28.2	-23

Table 6 shows Nuexco's forecast that world uranium production will decline in 1982 as a consequence of reduced demand for uranium in worldwide markets. As in 1981, Australia will be the major gainer, while the US will be the major loser. Countries in the "Others" category will show the most dramatic percentage changes, but their overall impact will remain negligible.

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Table 6

WORLD URANIUM PRODUCTION
(millions of pounds U_3O_8)

	1981 (Estimated)	1982 (Forecast)	Percent Change
US	36.7	28.2	23
Australia	8.1	12.1	+49
Canada	20.1	20.0	negligible
Republic of South Africa	15.9	16.6	+4
Other Africa	23.5	23.8	+1
France	5.8	6.7	+16
Other	1.5	2.3	+53
TOTAL	111.6	107.1	-4

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

Washington Public Power Supply System (WPPSS), known as "whoops" by supporters and critics alike, began the construction of five nuclear power plants in the early 1970's with a projected budget of $4 billion. Since that time, there have been many controversies involving the project, predominantly over cost overruns and management competency. The most recent controversy centered on WNP Units 4 and 5 and culminated with their cancellation.

WPPSS, the largest issuer of tax exempt bonds in the US with nearly $7 billion outstanding, has been raising funds at the rate of approximately $160 million every two months. The bonds are guaranteed for repayment whether the units are completed or not. The Bonneville Power Administration, a federal energy distribution agency in the northwest US, having agreed to buy the power from WNP Units 1, 2 and 3, is essentially guaranteeing the bonds for those three units. The bonds for WNP Units 4 and 5 are to be paid off by a group of 88 utilities. Because of this difference in backing, bonds for WNP Units 4 and 5 were more difficult to sell and WPPSS was running out of cash for their construction. Adding to their financing problems, studies indicated little need for the electricity the two units were to supply. Consequently, construction on WNP Units 4 and 5 was effectively halted in mid-1981 for a thorough review of the issue.

The mothball plan called for various utilities and customers to supply the funds to pay the interest charges on the $2.25 billion in bonds already issued for WNP Units 4 and 5. Even though the majority of the costs were to come from the larger utilities and users, many of the smaller municipal utilities were still reluctant to agree to the plan. Lacking their support, the plan failed and WPPSS had no choice but to terminate WNP Units 4 and 5.

The controversies surrounding WPPSS will not end with the termination of the two units. In November 1981, Washington state residents passed an initiative requiring voter approval of WPPSS's construction budget and bond issues after July 1, 1982. Bond fund trustees for WNP Units 1 through 3 have filed suit in federal court, charging the initiative is unconstitutional in that it impairs bondholders' contract rights.

With WNP Units 4 and 5 cancelled, WPPSS will have to begin accumulating funds to retire the bonds; that will mean an increase in the electricity rates charged by the 88 participating utilities. It is expected that there will be a challenge to the provision that calls for the bonds used to finance construction to be repaid whether the units are completed or not. This will likely mean the $4 billion in bonds needed by 1986 for WNP Units 1-3 will be much more expensive, as investors perceive increased risks with the project.

QUANTITATIVE FACTORS AFFECTING URANIUM PRICES

The January 31, 1982 Exchange Value of $23.00 per pound U_3O_8 marks a new low, after six months at $23.50 per pound U_3O_8. Some people had interpreted the six months of stability as a signal that the long-awaited bottom of the price decline had arrived; many people hoped that a rapid price recovery was imminent.

During the past year, Nuexco published a series of analyses which discussed some of the quantitative factors which affect uranium prices and which will have a substantial impact on their future behavior. This article will briefly review a few of those analyses.

Before proceeding, it is important to note that neither this article nor any of those it reviews attempts to forecast prices. To do so would be to ignore numerous *qualitative* factors, both internal and external to the uranium market, which are just as important as the quantitative factors.

Supply, demand and inventory are three major factors affecting the current market situation. A persistent imbalance between supply and demand has led to a

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buildup of inventory that is one of the most important reasons for the weakness of the uranium market. Nuexco Report 159 evaluated the supply and demand balance for the world. Table 7 is excerpted from that article. The production forecast, based on Nuexco data, was prepared on a mill by mill basis. The consumption figures are calculations by Nuexco that take into consideration various quantitative parameters of each individual reactor. Report 159 details the specific methodology used in Nuexco's calculation of Apparent Future Consumption (AFC).

The critical conclusions to be drawn from this table stem from the "Relative Inventory" line. At every point during this decade, (according to this analysis) world utilities will collectively hold an average of five to six years' worth of inventory. Studies have indicated that utilities would ideally like to hold between zero and a few years of inventory, but in no case do they wish to be holding five years' worth. Thus, Table 7 indicates that a large overhang of excess supply can be anticipated for at least the next eight years, even after ignoring any impact of government stockpiles.

Table 8 performs the same supply and demand comparison as Table 7, but for the US only. The US picture is somewhat different than the rest of the world, in that the rapidly declining US production will give some US utilities the option to reduce their high inventory levels through consumption. Nonetheless, inventory levels are sufficiently high so that it is only in the last few years of this decade that the forecast relative inventory diminishes to levels considered acceptable by utilities. In examining these two tables, it is difficult to perceive any potential scarcity of supply. This attitude is widely held by utilities; consequently, they feel little pressure to execute contracts for future supply. In addition, the perception by utilities that there is a significant quantity of uranium available, and that there will be for quite some time to come, has altered their concept of the ideal inventory level. Where a given utility might have felt in 1975 that a three-year forward inventory was required, current uranium availability may have caused the desired magnitude of this safety margin to be revised downward to one or two years.

An independent corroboration of this pessimistic

Table 7

URANIUM SUPPLY-DEMAND BALANCE: WOCA[1]
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
PRODUCTION[2]	111.0	109.8	106.6	107.8	107.8	103.7	104.7	108.3	108.2	107.1
less										
CONSUMPTION[3]	52.7	58.8	76.2	80.2	82.9	92.3	90.5	104.3	91.2	97.9
equals										
NET INVENTORY INCREASE	58.3	51.0	30.4	27.6	24.9	11.4	14.2	4.0	17.0	9.2
plus										
BEGINNING INVENTORY	367.8[4]	426.1	477.1	507.5	535.1	560.0	571.4	585.6	589.6	606.6
equals										
ENDING INVENTORY	426.1	477.1	507.5	535.1	560.0	571.4	585.6	589.6	606.6	615.8
RELATIVE INVENTORY (years)[5]	5.2	5.4	5.5	5.6	5.8	5.9	5.9	6.0	6.1	6.2

[1]World outside Communist areas
[2]Nuexco Report 158, Table 3
[3]Nuexco Report 159, Table 3
[4]Nuexco estimate
[5]For each year, Relative Inventory equals the number of years' forward consumption which could be supplied by that year's Beginning Inventory.

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MARKET ANALYSIS

Table 8

URANIUM SUPPLY-DEMAND BALANCE: US
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
PRODUCTION[1]	37.2	27.9	23.4	20.3	18.5	15.5	15.3	14.9	14.9	13.6
less										
CONSUMPTION[2]	20.6	21.4	28.2	29.6	31.4	36.1	34.2	37.6	33.9	40.4
plus										
NET IMPORTS (EXPORTS)[3]	(2.1)	0.7	0.8	2.6	0.4	1.9	1.0	1.4	1.5	1.5
equals										
SUPPLY SURPLUS (DEFICIT)	14.5	7.2	(4.0)	(6.7)	(12.5)	(18.7)	(17.9)	(21.3)	(17.5)	(25.3)
plus										
BEGINNING INVENTORY	147.8[4]	162.3	169.5	165.5	158.8	146.3	127.6	109.7	88.4	70.9
equals										
ENDING INVENTORY	162.3	169.5	165.5	158.8	146.3	127.6	109.7	88.4	70.9	45.6
RELATIVE INVENTORY[5] (yrs.)	5.5	5.5	5.3	4.9	4.6	4.1	3.5	2.9	2.3	1.8

[1]Nuexco Report 158, Table 1
[2]Nuexco Report 157, Table 6
[3]Nuexco Report 159, Table 8
[4]"US Uranium Market Developments"; S. Victoria Krusiewski and David C. Thomas; US DOE; Grand Junction, Colorado; October 1981.
[5]For each year, Relative Inventory equals the number of years' forward consumption which could be supplied by that year's Beginning Inventory.

outlook on the US inventory picture comes from the US Department of Energy. This table is reproduced as Table 9A. The USDOE conducted a survey of the US uranium industry in which it assessed the actual inventory level. Nuexco's survey of desired inventory levels is summarized in Table 9B. Note that even if the 64 million pound government excess did not exist, the available inventory would still be greater than the desired level by a factor of three. One reaction utilities have had to the excessive inventory situation has been to put some of their inventory on the market. In a reversal of the usual situation, non-producer sellers represented over 40 percent of the spot and near-term market volume in 1981 and non-producers bought only 73 percent of the material.

In drawing conclusions based on quantitative analysis, it is imperative to be aware of the basis on which the analysis was done. In some ways, the use of AFC as the demand component of Tables 7 and 8 is a realistic model of what will happen, but not necessarily of utilities' current perceptions of what will happen. A three-part essay in Reports 151, 153 and 154 examined these utility

Table 9
ASSESSMENT OF US URANIUM INVENTORY POSITION
(millions of pounds U_3O_8 equivalent)

A. AS OF JANUARY 1, 1981[1]

Producers	5.4
Electric Utilities	142.4
US DOE	163.8
Total	311.6

B. DESIRED POSITION[2]

Producers	5
Electric Utilities	35
US DOE	100
Total	140

[1]Nuexco Report 160, Table 1
[2]Nuexco Report 160, Table 2

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MARKET ANALYSIS

Table 10

A. WORLD UTILITY DEMAND[1]
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Far East	8.0	12.4	13.7	16.2	18.2	21.0	20.9	22.3	22.1	22.5
Europe	32.3	39.5	39.6	44.9	42.8	46.8	51.2	48.0	49.1	49.0
Other WOCA	4.0	5.3	6.5	6.3	7.0	7.4	8.7	8.6	7.9	9.1
US	36.6	37.3	42.4	48.3	52.9	55.9	55.9	56.9	57.5	57.3
World Total:	80.9	94.5	102.2	115.7	120.9	131.1	136.7	135.8	136.6	137.9
Cumulative:	81	175	278	393	514	645	782	918	1,054	1,192

B. WORLD UTILITY DEMAND LESS AFC[2]
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Far East	1.1	5.5	6.9	5.1	6.5	9.4	10.2	12.7	13.6	13.8
Europe	6.7	10.6	4.2	14.1	6.5	8.8	6.3	5.6	5.8	6.3
Other WOCA	0.9	0.2	0.6	1.2	2.4	1.5	1.2	1.6	2.3	3.0
US	15.7	14.4	15.3	17.9	20.1	20.4	20.8	19.3	17.1	17.0
World Total:	24.4	30.7	27.0	38.3	35.5	40.1	38.5	39.3	38.8	40.0
Cumulative:	24	55	82	120	156	196	235	274	313	353

[1]Nuexco Report 154, Table 6
[2]Nuexco Report 154, Table 7

Table 11

IMPACT OF CANCELLED REACTORS 6/79-6/81[1]

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991-1995
Cancelled GWe	0	0	1.1	.6	1.2	2.4	.9	5.7	.9	4.5	8.3
Cumulative Cancelled GWe	0	0	1.1	1.7	2.9	5.3	6.2	11.9	12.8	17.3	25.6
Lost Demand (millions of pounds U_3O_8)	1.1	0.6	1.5	2.9	2.3	6.8	4.1	8.7	4.5	8.1	41.6
Cumulative Lost Demand (millions of pounds U_3O_8)	1.1	1.7	3.2	6.1	8.4	15.2	19.3	28.0	32.5	40.6	82.2

[1]Nuexco Report 160, Table 5

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perceptions; Tables 10A and 10B summarize the results. While Apparent Future Consumption was derived empirically, the demand figures published in these Reports were determined by canvassing the utilities on an individual basis. Generally, it was found that utilities had a perception of greater need than Nuexco's AFC calculations would indicate. However, as one projects fewer and fewer years into the future, the utilities' perception comes closer and closer to the calculated AFC estimate. Thus, AFC can be considered to be the most likely demand case, while demand based on utility perceptions of need is the idealistically high demand case.

Table 12

IMPACT OF FORECAST CANCELLATIONS[1]

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991-1995
Cancelled GWe	0	0	0	1.2	1.3	1.2	2.4	1.2	2.5	2.3	4.9
Cumulative Cancelled GWe	0	0	0	1.2	2.5	3.7	6.1	7.3	9.8	12.1	17.0
Lost Demand (millions of pounds U_3O_8)	0	1.2	1.3	2.0	3.6	3.1	4.5	5.5	5.9	5.2	27.9
Cumulative Lost Demand	0	1.2	2.5	4.5	8.1	11.2	15.7	21.2	27.1	32.3	60.2

[1]Nuexco Report 160, Table 6

Table 13

A. WORLD UTILITY UNFILLED DEMAND[1]
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Far East	0.0	0.1	0.1	0.1	0.3	1.8	1.3	4.3	3.4	6.4
Europe	1.5	1.7	3.3	3.7	3.9	5.5	5.7	6.9	8.4	7.4
Other WOCA	0.4	0.7	1.8	1.6	2.3	1.6	1.9	2.6	1.9	2.2
US	0.3	1.5	4.4	6.4	12.3	14.9	23.8	28.9	33.6	36.3
World Total:	2.2	4.0	9.6	11.8	18.8	23.8	32.7	42.7	47.3	52.3
Cumulative:	2	6	16	28	46	70	103	146	193	245

B. WORLD UNSOLD PRODUCTION[2]
(millions of pounds U_3O_8)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Annual:	16.8	16.8	17.5	22.4	25.1	32.9	35.8	37.3	40.2	39.6
Cumulative:	17	34	51	74	99	132	167	205	245	284

[1]Nuexco Report 154, Table 8
[2]Nuexco Report 154, Table 9

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MARKET ANALYSIS

Tables 10A and 10B quantify the difference between demand and AFC. The difference between the two sets of numbers reflects the safety margin which the utilities build into their estimates of needs to insure security of supply. Unfortunately for the uranium market, it is far more likely that consumption will approximate the AFC figures rather than the demand figures. Therefore, the AFC numbers are more likely to yield an accurate representation of the effect of consumption on the balance between supply and demand.

Report 160 included an analysis of reactors that have been cancelled over the past two years and the impact that the cancellation of these units had upon demand. That impact is indicated in Table 11. Until the reactors were officially cancelled, the utilities had to plan for their fuel supply, so their perceived demand was higher than their actual needs proved to be. The AFC calculation had already made an allowance for these cancelled units. Nuexco estimates that more than a dozen additional reactors will be cancelled over the next few years. Those cancellations will also reduce utilities' perceptions of demand. The impact of those forecast cancellations is quantified in Table 12. The reactors Nuexco expects to be cancelled have been removed from the AFC database, but there still is a demand component until the utilities formally cancel them.

Tables 13A and 13B show the utilities' estimates of unfilled demand and Nuexco estimates of the world unsold production available to fill it. Not until 1990 does the cumulative total of unfilled demand overtake the cumulative total of world unsold production. Even under this form of analysis, the quantitative factors point toward a decade of excess supply and downward pressure on uranium prices.

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ESSAY

URANIUM PRICES AND LONG-TERM CONTRACTS

In Nuexco Report 159, the *Essay* discussed the definition of Exchange Value in some detail. Specifically, it attempted to clarify what the Exchange Value is and what it is not. The *Essay* concluded that there is consensus within the uranium industry that the Exchange Value is one indicator of the level of spot market prices. Unfortunately, from the viewpoint of many buyers and sellers, there is no corresponding indicator of the level of long-term market prices.

Long-term Uranium Prices

It is quite understandable that there is no generally accepted indicator of the long-term market price of uranium. There is not even consensus regarding the meaning of the term "long-term market price." Repeated attempts to define the term have failed. Without consensus on the definition, it has been impossible to obtain general agreement on what would be measured, how it would be measured, what time frame would be considered or how frequently it would be measured.

Lacking a generally recognized indicator of long-term market price, buyers and sellers have repeatedly attempted to develop pricing mechanisms that will generate, throughout the delivery period, prices that will prove acceptable to both parties upon delivery of the material. The high incidence of uranium contract disputes in recent years indicates that, notwithstanding some notable exceptions, such pricing mechanisms have generally failed to achieve their objectives. As more buyers and sellers try to enforce or repudiate contracts, more litigation is likely.

Among a wide variety of increasingly complex pricing mechanisms, the most commonly used types are those based on some function of:

1. spot market price level;
2. production cost;
3. base price.

Each of these pricing mechanisms has limitations which can lead to large variations in prices applicable to current deliveries under long-term contracts.

The Exchange Value is primarily an indicator of the level of spot market prices. To a lesser degree, it provides valuable information about the price situation in the near-term market (in which deliveries are completed within 12 months of contract execution). The use of Exchange Value (or any other indicator of spot market price levels) to price future deliveries under a long-term contract exposes such future prices to whatever volatility may occur in the spot and near-term markets.

The uranium industry is characterized by price-conscious buyers and wide variations in producers' costs. A price that provides a 25 percent rate of return for a US open pit operation having a head feed grade of 0.20 percent U_3O_8 might be enormously profitable for Australia's Nabarlek deposit which has a head feed grade of nearly 2.0 percent U_3O_8; that same price could mean economic disaster for a deep underground operation having a head feed grade of 0.10 percent U_3O_8. As long as this situation prevails, the determination of long-term market price as a function of production cost or return on investment will be feasible only on a case-by-case basis. Variations in producers' cost structures will prevent the adoption of either a reference production cost function or a standard return on investment.

Long-term pricing using an escalated base price formula is also susceptible to wide variations, particularly as a function of when in the market cycle the particular contract is executed. Even contracts executed at approximately the same time with similar base prices may produce substantially different prices in latter years due to differing escalation provisions.

Finally, there is a fundamental difference between the spot market and the intermediate or long-term markets which makes it much more difficult to develop a consensus regarding price levels in the latter. In the spot market, there is virtually total certainty. The material to be sold has already been produced. Contracting terms tend to focus only on delivery date, price and payment. As a consequence, there is price certainty within a narrow band. On the other hand, inherent in a long-term contract are numerous uncertainties, including future production costs, political developments, government regulations, future market behavior, delivery flexibility and the financial intergrity of the parties. These factors can all affect price either directly or indirectly. Consequently, the price band for such contracts will almost certainly be quite wide.

Even though many buyers and sellers would like to see a generally recognized, objectively determined indicator of long-term market price, the development of such a price seems unlikely. Therefore, the determination of prices in long-term agreements will continue to be a controversial subject for buyers and sellers. Each agreement will require an independent price negotiation in which the parties will have to determine which price mechanism best suits their individual situations. Further,

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it seems likely that events and price trends in nearer-term markets will continue to influence price negotiations for long-term contracts, even though some buyers and sellers deplore that influence.

Long-term Contracts

The comparison of current delivery prices under long-term contracts to current spot market prices has caused problems with respect to both existing long-term uranium supply contracts and negotiations of new contracts. The problems with existing contracts are of two distinct types, but both originate with contracts and pricing terms which were entered into (or renegotiated) during the 1975-1978 period when prices peaked. In the first case, delivery prices are directly related to Exchange Value or some other published indicator. The decline in Exchange Value has led to some producers receiving prices which are less than their costs of production. Such a situation would be intolerable to producers in the long term. Consequently, both buyers and sellers are searching for pricing approaches which will mitigate such difficulties in new contracts for intermediate or long-term delivery. However, in today's market, many buyers are unwilling or unable to enter into contracts in which the price mechanism might cause them to pay more than spot market price at time of delivery. This effectively rules out cost formulas, escalated base prices and those "market price" contracts that contain floor or minimum prices, unless the buyer has the right to refuse delivery when the contract price exceeds the spot market price.

For their part, most sellers are unwilling or unable to guarantee delivery at spot market prices without some type of minimum pricing. Two reasons are apparent. First, and particularly in the US where average production costs are higher, guaranteed delivery at spot market price may lead to a long-term delivery obligation at prices which are below costs of production. Few sellers are willing to take such economic risks. Second, government policies in some countries prohibit such contracting without some type of minimum pricing.

In the second case, delivery prices are determined in accordance with an escalated base price or cost formula. This includes those contracts that provide for the buyer to pay the higher of a formula price or a market-related price. In many such instances, current delivery prices are well above current Exchange Value; in some instances, they even exceed $60.00 per pound U_3O_8. From the buyer's standpoint, the disparity between such delivery prices and current spot price is costly and embarrassing. These contracts and the prices being paid are subject to continuous scrutiny and criticism by utility management, by the news media, by local and federal regulatory authorities and, in the event of litigation or arbitration, by courts or arbitrators.

That the conflict between the positions of buyers and sellers should be so highly politicized is, for the most part, due to the nature of the uranium users (the electric utilities) and the nature of uranium itself. For example:

—The utility operates in a goldfish bowl environment. Every move is likely to be second-guessed by regulatory agencies, which are well aware not only of the price the utility pays for its uranium, but also of the generally perceived spot price of uranium at any point in time.

—Unlike oil and coal, the traditional utility fuels, uranium is produced as a standard concentrate. One producer's uranium is as good as another's. Thus, delivered prices for uranium are directly comparable.

—The transportation cost of uranium, unlike that of oil and coal, is a very small fraction of the delivered price, again making utility purchases comparable.

—Regulatory agencies seldom distinguish uranium purchased on the spot or near-term market, from uranium purchased under long-term contracts.

Thus, for the first time, utilities are using a fuel which is fungible on an international level. Therefore, the utilities are often under pressure to pay no more than the generally perceived spot price at the time of delivery. The result is an impasse.

This impasse has been complicated for buyers, sellers and regulators by the failure to distinguish the spot market from the longer-term market. These markets are actually quite different and so, consequently, are the prices associated with them:

1. Most uranium is delivered under intermediate or long-term agreements. These agreements constitute base load production for the supplier and base load supply for the utility. Therefore, in order for such arrangements to function effectively, prices must cover, over the long term, full cost of production and provide an adequate return on investment for the producer.

2. Most uranium sold for spot or near-term delivery comes from a producer's incremental output or a utility's excess inventory. Consequently, prices for such deliveries need not be, and often are not, related in any way to the production cost of the material sold. Prices vary widely based on the perceived balance of supply and demand.

To concentrate on current spot market prices to evaluate

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ESSAY

longer-term contracts is to confuse these two fundamentally different markets. It also ignores the benefits, other than price, which flow from a long-term relationship.

The decision to use Exchange Value to define delivery prices under a long-term contract is a matter for negotiation between buyer and seller when they enter into a contract. If buyers and sellers choose to use Exchange Value in this way, it is vital that both parties to the contract have complete mutual understanding of what the Exchange Value is and what it is not; then, both parties will be able to weigh the potential consequences of such use before they execute the contract.

The propensity of outside parties to use the current Exchange Value to evaluate contracts executed years earlier under different market conditions has created problems for buyers and sellers alike. To concentrate on today's level of spot prices sometimes impedes attempts to execute new long-term contracts. However, as long as regulatory authorities, utility managements and influential special-interest groups insist on comparing the prices of uranium delivered under long-term contracts to spot prices at time of delivery, utility buyers can be expected to exert pressure on sellers to offer long-term prices related to the spot market.

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SHOOTARING CANYON PROJECT

Introduction

Plateau Resources Ltd. has scheduled initial yellowcake production at its Shootaring Canyon project for the second quarter of 1982. The start of commercial operations would climax a uranium procurement program initiated almost seven years ago by Consumers Power Co.

Plateau was established in June 1976 as a wholly-owned subsidiary of Consumers Power Co. Plateau assumed the responsibility of expanding an existing uranium program with a primary objective of discovering uranium deposits to eventually supply uranium fuel for Consumers' nuclear generating program. Production capacity of the new plant is designed to satisfy all of Consumers' uranium requirements.

Project Description

Plateau initiated an aggressive exploration program almost immediately following its formation in 1976. An active program in the Henry Mountain district of southeast Utah was accelerated and additional prospect acreage was acquired in the Shootaring Canyon area. The program was eventually expanded to include about 250,000 acres of potential uranium-bearing ground throughout Wyoming, Colorado, Utah, Nevada, New Mexico and Arizona. At least 50 different prospects were under evaluation by Plateau at the peak of program activity in 1978 and 1979.

In conjunction with the exploration program, Plateau opened an ore-buying station in 1977 at Blanding, Utah to purchase ore mined by local independent miners to supplement future production from other Plateau projects. However, the buying station was closed in January 1979.

In 1981, essentially all exploration activity outside the Shootaring Canyon project area was terminated and the various prospects were divested. Full development of the Shootaring Canyon project was assigned first priority. Mine development had started by September 1977; the mill was sited in May 1978. The final environmental study was issued in July 1979 and construction began within 45 days. Figure 1 is a location map of the Shootaring Canyon area of interest.

Mine Development

Evaluation of the Shootaring Canyon project area required several years of detailed exploration. Nearly 2,000 drill holes, totaling about one million feet, were required to determine the potential of the 22,500 acre property. Drilling is continuing around the peripheral edges of the known orebodies and additional ore reserves are being discovered, especially along the down-dip extension of the main mineralized trend.

The Shootaring Canyon uranium deposits are being developed as two separate mines. The main mine, known as the Tony M, uses a double entry decline method of development. Two parallel adits measuring nine feet by 11 feet are being driven from the canyon wall on a three percent grade at a bearing of North 22 degrees West. The two adits are 50 feet apart and have been designated the West drift and the East drift. The drifts have advanced almost simultaneously and, as of the end of 1981, advance was in excess of 6,700 feet for the West drift and 7,000 feet for the East drift. Total planned length of each drift is in excess of 12,000 feet. However, considering the ore extensions discovered by recent drilling, it is likely that each drift will continue well beyond the planned length.

The two drifts will serve as the main access to all ore mined from the Tony M mine. The East drift will be reserved for all traffic and materials entering and leaving the mine; the West drift will be reserved for a 36 inch conveyor haulage system to transport ore and waste from the mine. The two drifts have been located to facilitate ready access to all orebodies. However, direct access to individual orebodies will be by lateral development drifts off either main drift. The lateral drifts will be positioned at irregular intervals as required to properly intersect a particular orebody; however, the minimum spacing will be on 136 foot centers. Actual mining of the ore will be a modified room and pillar technique designed to gain maximum production from the irregular configuration of each orebody.

The orebodies will be developed by driving parallel cross-cut drifts off the laterals on a regular spacing of 136 feet. A second set of cross-cut drifts will be driven on the same spacing but at right angles to the first set to establish rows of pillars within each ore zone. Mining of the pillars will begin at the outside limits of the developed ore zone, eventually retreating back toward the lateral drifts in the final stages of mining. Lateral development is already progressing rapidly into a number of ore-bearing areas. In fact, 13 miles of development work was completed by the end of 1981. Ore production from development activities is currently being maintained at about 500 tons per day. Production will eventually be increased to 1,700 tons ore per day, four days per week. In addition, about 650 tons of waste will be mined per day as mine development progresses.

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Figure 1

LOCATION MAP — URANIUM MINE & MILL PROJECT OF PLATEAU RESOURCES LTD., SHOOTARING CANYON AREA, UTAH

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Figure 2 is a photograph of the Tony M minesite.

The second mine, the Frank M, will be located on an irregular-occurring mineralized trend that strikes approximately North 60 degrees West and lies three miles north of the Tony M. The Frank M will be developed through a single entry decline off the mesa top rather than in from the canyon rim as is the case at Tony M. The decline will be driven 2,356 feet at a minus 20 percent grade to intersect the ore zone. Once the ore-bearing horizon is encountered, it will be developed by a double haulage drift system similar to the access system being utilized at the Tony M. The drifts will be inclined at a grade of five percent and progress on a heading of North 40 degrees West about 400 feet, continue at North 60 degrees West another 400 feet and then follow the ore 600 plus feet on a bearing of South 80 degrees West. Lateral drifts are to be driven from the two main haulage drifts and room and pillar development and mining of the orebody will be the same as at the Tony M. Initial development of the Frank M is scheduled to coincide with the phase out of the Tony M. Full production of the Frank M eventually will total 1,700 tons ore per day.

Mill Complex

Construction of the Shootaring Canyon processing facility began on September 21, 1979, after lengthy siting and environmental studies requiring approvals by the US Nuclear Regulatory Commission. The new facility has a design capacity of 750 tons ore per day; however, the operating capacity could be increased to about 1000 tons ore per day with limited modification.

The mill utilizes a conventional process common throughout the uranium industry. The primary mill circuit involves semi-autogenous grinding of the sandstone ores, followed by dissolution of the uranium from the finely-ground material with the use of sulfuric acid. The uranium-rich acid solution is separated from the leached sands in a six-stage counter-current decantation proces. The waste sands are discharged as tailings to an open impoundment site. The tailings storage site has been prepared below grade for gravity flow; in addition, the site was prepared with a clay sealed base to prevent seepage of radioactive material. A unique under-drainage system was installed to drain the tailings liquid from the slurry to reduce the hydraulic head on the clay liner, thus reducing the probability of underground seepage.

Uranium in solution is transferred from the aqueous acid phase to an organic phase by a solvent extraction process. Ammonium sulfate is used to remove the uranium from the organic phase, followed by uranium precipitation with the injection of ammonia gas. The final precipitate (yellowcake) is further washed, dried and packed into 55 gallon drums. When the mill reaches full production capacity, the work force will total approximately 50 employees. Figure 3 is a photograph of the milling facilities.

Townsite Preparation

The Shootaring Canyon project is located in a remote section of southeast Utah. Because only one established community exists within a 100 mile radius of the project area, Plateau was faced with the problem of arranging housing and other accommodations for workers and their families near the project site. When the project is in full operation, the Company will employ approximately 210 people at the site and about 40 in the administrative group located at Grand Junction, Colorado.

Plateau decided to overcome the problem by building a town near the project. A subsidiary of Plateau entered into a joint venture with Ticaboo Development Inc. for that purpose. The resulting union, the Ticaboo Townsite Joint Venture, undertook to plan and develop the community of Ticaboo.

The new community is situated on a 640 acre, state-owned tract along the eastern edge of Ticaboo mesa. The joint venture secured a lease from the state of Utah which gives it the exclusive right to develop a community on the selected site. A master plan designed for the Ticaboo community includes single and multiple-family dwellings, a mobile home park, medical facilities, a commercial area and a community services area. Phase 1 of the development, completed about mid-1981, consists of roads, sewer, water and electric power distribution facilities, housing and trailer sites, commercial facilities and support school, medical and maintenance facilities. Phase 2 will involve additional development as population growth requires. The population of Ticaboo could reach 700 to 800 by the time the project is operating at full capacity.

Orebody Geology

The uranium deposits in the Shootaring Canyon area are confined to fluvial sand facies in the Salt Wash Member of the Morrison Formation of Jurassic age. Typically, the Salt Wash consists of interbedded coarse to fine sandstone and mudstone units. The sandstones form up to seven distinct units, often referred to as "rims" by the miners. The rims often coalesce into three thick, channel-filling units recognized by the miners as favorable host rock for uranium/vanadium mineralization.

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Figure 2

SHOOTARING CANYON MINE SITE. THE PORTALS OF THE EAST & WEST ACCESS DRIFTS ARE LOCATED ON THE LEFT. ORE REACHES THE SURFACE VIA THE EAST DRIFT AND IS DUMPED IN THE STORAGE BINS ACCORDING TO ROYALTY OBLIGATION. THE BUILDING HOUSES MINE OFFICES, CHANGE ROOMS AND SUPPORT FACILITIES. NOTE OLD MINE PORTALS AT RIGHT CENTER.

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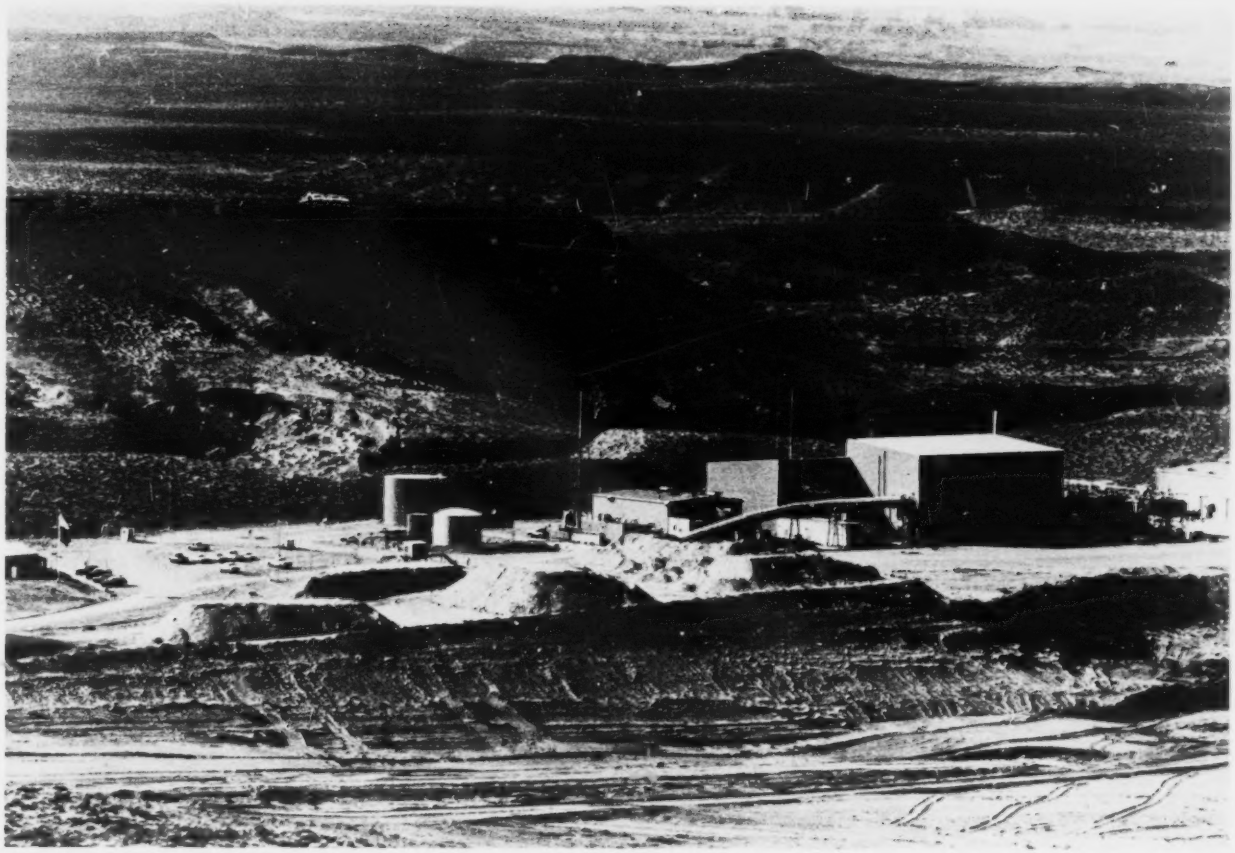

Figure 3

**SHOOTARING CANYON MILL SITE SHOWING
ORE STOCKPILE AREA AND MAIN MILL BUILDINGS**

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Outside the Henry Mountain district, a large percentage of ore occurs in the uppermost portion of the three rims. However, the Shootaring Canyon deposits occur in the lower portion of the massive bottom rim. The ore is confined to two horizons within the 400 to 500 foot thick channel sandstone. The ore in the Tony M mine area occurs within a 30 foot zone directly above the base of the lower rim, which in turn overlies the Tidwell Member of the Morrison Formation. Ore in the Frank M mine area occurs 60 to 100 feet above the base of the Salt Wash. Figure 4 shows the relationship of the ore zones at Shootaring Canyon to the stratigraphy of the district.

The ore deposits are usually tabular and elongated parallel to the sedimentary trend of each sandstone unit. The geologic structure of the area is characterized by a gentle northwesterly dip of two to five degrees. No faulting or other structural irregularities are known to occur in the vicinity of the ore deposits.

The most abundant uranium ore mineral identified in the unoxidized zone is coffinite, a uranium silicate, followed by uraninite, a uranium oxide. Carnotite is the most common mineral occurring in the oxidized zone. It is a uranium vanadate and it is often associated with montroseite, the most important vanadium mineral present. Uncharacteristically of most Salt Wash ores, the Shootaring Canyon deposits contain only minor amounts of vanadium.

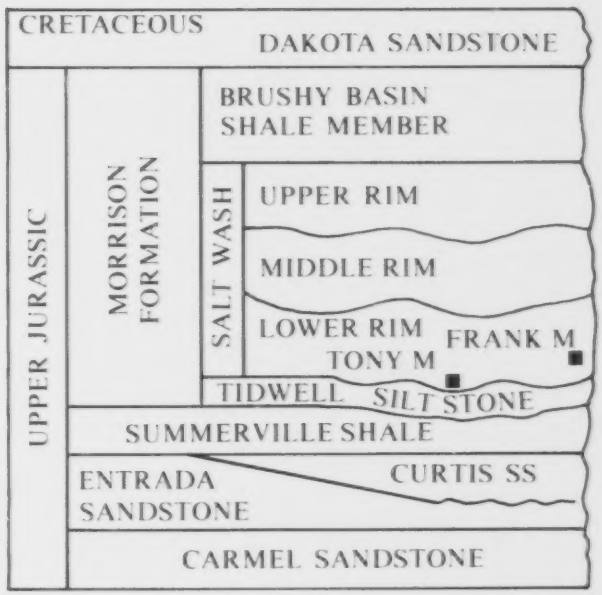

Figure 4

GENERALIZED STRATIGRAPHIC SECTION OF THE URANIUM-BEARING SALT WASH RIMS AT SHOOTARING CANYON; ORE HORIZON HIGHLIGHTED

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STATISTICAL DATA

EXCHANGE VALUE $23.00/lb. U_3O_8
Determined as of January 31, 1982

Definition

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

TRANSACTION VALUE
Determined as of January 31, 1982

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
24.00	2.8	20	5

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

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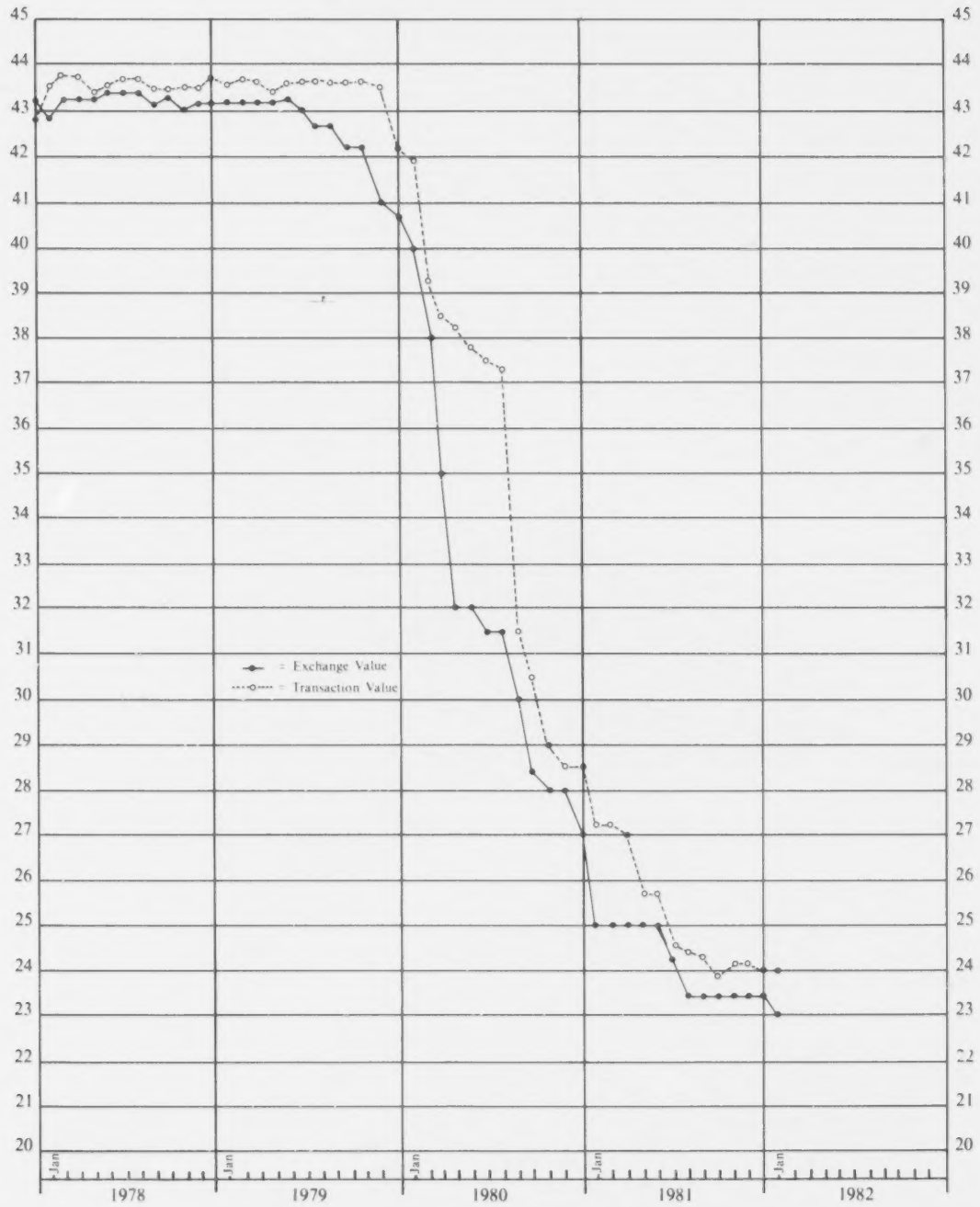
STATISTICAL DATA

EXCHANGE AND TRANSACTION VALUES
SINCE JANUARY 1978
Determined as of the last day of the month indicated



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STATISTICAL DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00											

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00											

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES*

Country	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
US (dollar)	23.00	50.71	59.79
France (franc)	136.01	299.86	353.61
FRG (mark)	53.48	117.89	139.03
Japan (yen)	5,303	11,692	13,787
Switzerland (franc)	42.71	94.16	111.04
UK (pound)	12.25	27.00	31.84
Australia (dollar)	20.90	46.07	54.32
Canada (dollar)	27.57	60.78	71.67
Niger, Gabon (CFA)	6,805	15,002	17,691
South Africa (rand)	22.38	49.35	58.19
Sweden (kröner)	130.76	288.27	339.94

*Calculated using currency exchange rates published in the Wall Street Journal on the last business day of the month.

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STATISTICAL DATA

CONVERSION VALUE $1.20/lb. U as UF_6
Determined as of January 31, 1982

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:
A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:
A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

LOAN USE CHARGE RATE 6%
Determined as of January 31, 1982

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:
A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

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STATISTICAL DATA

HISTORICAL LOAN USE CHARGE RATE
Determined as of the last day of the month indicated
(percent per annum)

1968

Report No.	Month	Rate for Return Before 1/1/71
01	Aug	4.0%
02	Sep	4.0%
03	Oct	4.0%
04	Nov	4.0%
05	Dec	4.0%

1969

Report No.	Month	Rate for Return Before 1/1/71
06	Jan	4.0%
07	Feb	4.0%
08	Mar	5.0%
09	Apr	5.0%
10	May	5.0%
11	Jun	5.0%
12	Jul	5.0%
13	Aug	5.0%

Report No.	Month	Rate
14	Sep	6.0%
15	Oct	6.0%
16	Nov	6.0%
17	Dec	6.0%

1970

Report No.	Month	Rate
18	Jan	6.0%
19	Feb	6.2%
20	Mar	6.4%
21	Apr	6.5%
22	May	6.5%
23	Jun	6.5%
24	Jul	6.5%
25	Aug	5.0%
26	Sep	6.5%
27	Oct	6.0%
28	Nov	5.5%
29	Dec	5.5%

1971

Report No.	Month	Rate
30	Jan	5.0%
31	Feb	4.75%
32	Mar	4.75%
33	Apr	4.75%
34	May	5.0%
35	Jun	5.25%
36	Jul	5.25%
37	Aug	5.25%
38	Sep	5.25%
39	Oct	5.25%
40	Nov	4.5%
41	Dec	4.5%

1972

Report No.	Month	Rate
42	Jan	4.0%
43	Feb	4.0%
44	Mar	4.0%
45	Apr	4.5%
46	May	4.5%
47	Jun	4.5%
48	Jul	5.0%
49	Aug	5.0%
50	Sep	5.0%
51	Oct	5.0%
52	Nov	5.0%
53	Dec	5.0%

1973

Report No.	Month	Rate
54	Jan	5.5%
55	Feb	5.5%
56	Mar	5.75%
57	Apr	5.75%
58	May	6.00%
59	Jun	6.25%
60	Jul	7.00%
61	Aug	7.00%
62	Sep	7.00%
63	Oct	7.00%
64	Nov	7.5%
65	Dec	8.00%

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1974

Report No.	Month	Rate
66	Jan	8.00%
67	Feb	8.00%
68	Mar	8.00%
69	Apr	8.00%
70	May	8.00%
71	Jun	8.00%
72	Jul	8.00%
73	Aug	8.00%
74	Sep	8.00%
75	Oct	8.00%
76	Nov	8.00%
77	Dec	8.00%

1975

Report No.	Month	Rate
78	Jan	8.00%
79	Feb	7.00%
80	Mar	7.00%
81	Apr	7.00%
82	May	7.00%
83	Jun	6.50%
84	Jul	6.50%
85	Aug	6.50%
86	Sep	6.50%
87	Oct	6.50%
88	Nov	6.50%
89	Dec	6.50%

1976

Report No.	Month	Rate
90	Jan	6.5%
91	Feb	6.5%
92	Mar	6.5%
93	Apr	6.5%
94	May	Floats with prime rate
95	Jun	Floats with prime rate
96	Jul	Floats with prime rate
97	Aug	Floats with prime rate
98	Sep	Floats with prime rate
99	Oct	Floats with prime rate
100	Nov	Floats with prime rate
101	Dec	Floats with prime rate

1977

Report No.	Month	Rate
102	Jan	Floats with prime rate
103	Feb	Floats with prime rate
104	Mar	Floats with prime rate
105	Apr	Floats with prime rate
106	May	6.50%
107	Jun	6.50%
108	Jul	6.50%
109	Aug	6.75%
110	Sep	7.25%
111	Oct	7.25%
112	Nov	7.25%
113	Dec	7.25%

1978

Report No.	Month	Rate
114	Jan	7.25%
115	Feb	7.00%
116	Mar	7.00%
117	Apr	7.00%
118	May	7.00%
119	Jun	7.50%
120	Jul	7.75%
121	Aug	7.75%
122	Sep	7.75%
123	Oct	7%
124	Nov	7%
125	Dec	7%

1979

Report No.	Month	Rate
126	Jan	7%
127	Feb	7%
128	Mar	7%
129	Apr	7%
130	May	7%
131	Jun	7%
132	Jul	7%
133	Aug	7%
134	Sep	7%
135	Oct	7%
136	Nov	7.0%
137	Dec	7.0%

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STATISTICAL DATA

1980			1981		
Report No.	Month	Rate	Report No.	Month	Rate
138	Jan	7.0%	150	Jan	7.0%
139	Feb	7.0%	151	Feb	7.0%
140	Mar	7.0%	152	Mar	7.0%
141	Apr	7.0%	153	Apr	7.0%
142	May	7.0%	154	May	7.0%
143	Jun	7.0%	155	Jun	7.0%
144	Jul	7.0%	156	Jul	5½%
145	Aug	7.0%	157	Aug	5½%
146	Sep	7.0%	158	Sep	5½%
147	Oct	7.0%	159	Oct	5½%
148	Nov	7.0%	160	Nov	6%
149	Dec	7.0%	161	Dec	6%

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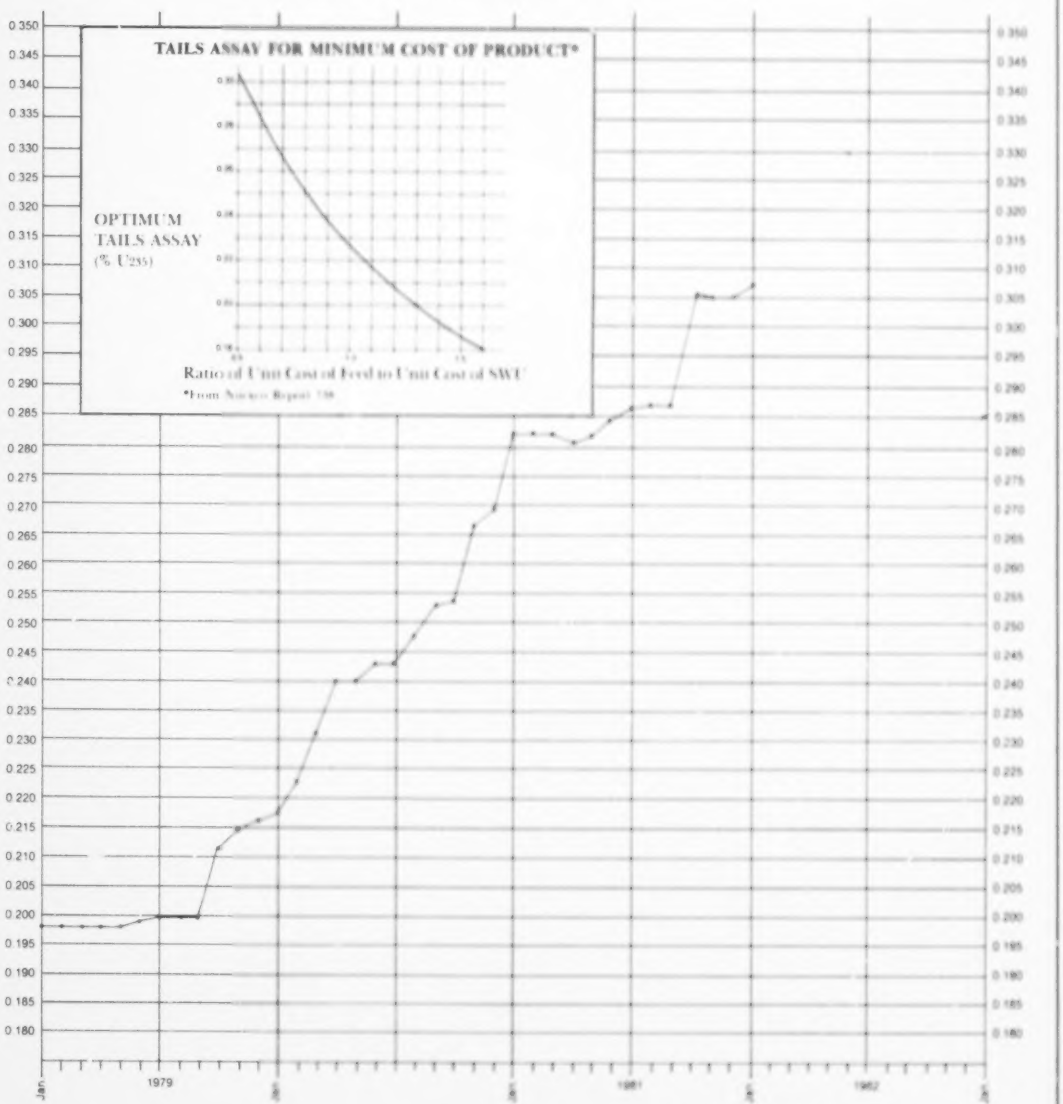
STATISTICAL DATA

OPTIMUM TAILS ASSAY

The optimum tails assay is the tails composition at which the cost of enriched uranium is lowest for given costs of separative work (SWU) and natural uranium feed. It depends only on the ratio of the cost of a kilogram of natural uranium in the form of UF_6 to the cost of a kilogram unit of separative work. Holders of US Department of Energy (USDOE) Adjustable Fixed Commitment (AFC) enrichment contracts have the option to specify, within limits, the transaction tails assay. The transaction tails assay for USDOE Requirements contracts is 0.2 percent U_{235}. For every one-hundredth of one percent increase in the transaction tails assay, natural uranium consumption increases about two percent.

OPTIMUM TAILS ASSAY[1]



[1]Based on Exchange Value and USDOE AFC SWU price; interpolated to the nearest thousandth.

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STATISTICAL DATA

US GOVERNMENT STATISTICS

	Producer Price Index—Industrial Commodities (1967 = 100)[1]	Producer Price Index—All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1971[5]	114.1	114.0	121.3	96.02	4.12	4.15	3.97	3.49
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.80	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	116.02	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	127.15	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	133.71	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	141.70	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	152.05	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	165.46	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	177.36	10.27	10.63	8.30	6.95
Annual Avg. 1981	—	—	—	193.58	—	—	—	—
Feb 1981	295.7	287.6	263.2	—	11.15	11.36	8.80	7.43
Mar 1981	299.6	290.3	265.1	188.14	11.13	11.50	8.84	7.47
Apr 1981	303.5	293.4	266.8	—	11.30	11.63	8.94	7.51
May 1981	304.7	294.1	269.0	—	11.26	11.68	8.99	7.55
Jun 1981	305.1	294.8	271.3	191.06	11.31	11.88	9.07	7.50R
Jul 1981	306.2	296.2	274.4	—	11.61	12.19	9.16	7.69
Aug 1981	307.2R	296.4R	276.5	—	11.85	12.09	9.19	7.76
Sep 1981	309.2R	295.5P	279.3	195.61	12.11	12.68	9.38	7.79
Oct 1981	308.8P	296.0P	279.9	—	12.12P	12.46P	9.34P	7.84P
Nov 1981	309.1P	295.5P	280.7	—	12.19P	12.47P	9.39P	7.87P
Dec 1981	310.1P	295.9P	281.5	199.58	—	—	9.47P	7.98P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2]US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3]US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4]US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5]Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

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STATISTICAL DATA

AUSTRALIAN GOVERNMENT STATISTICS

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Weighted Average Minimum Weekly Wage Rates—Adult Males Australia Mining and Quarrying (A$)[2]
Annual Avg. 1970[3]	101.4	59.88
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Sep 1980	350.3	219.60
Oct 1980	348.2	221.07R
Nov 1980	350.4	221.44R
Dec 1980	351.7	222.35R
Jan 1981	357.8	230.53R
Feb 1981	356.6	230.35R
Mar 1981	355.2	229.60R
Apr 1981	354.6	229.32R
May 1981	353.4	237.24R
Jun 1981	360.4	237.56R
Jul 1981	357.5	237.42R
Aug 1981	360.3	237.42R
Sep 1981	357.8	237.38R
Oct 1981	352.0P	238.65R
Nov 1981	350.8P	340.30P

P = Preliminary R = Revised since last month

[1]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.
[2]Australian Bureau of Statistics, Canberra: "Wage Rates, Australia" (Catalogue No. 6312.0), Table 1. Figures for the latest fourteen months shown are subject to revision.
[3]Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

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STATISTICAL DATA

CANADIAN GOVERNMENT STATISTICS

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[3] [4]		
		Metal Mining, including Milling (SIC 050-059)	Primary Metal Industries, non-ferrous (SIC 296-298)	Chemicals and Chemical Products (SIC 370-379)
Annual Avg. 1977	174.3	8.18	6.50	6.51
Annual Avg. 1978	190.4	8.76	6.82	6.97
Annual Avg. 1979	217.9	9.60	7.35	7.67
Annual Avg. 1980	247.2	10.59	8.05	8.50
Sep 1980	252.0	10.85	8.24	8.71
Oct 1980	256.0	11.05	8.28	8.82
Nov 1980	257.8	11.11	8.38	8.77
Dec 1980	258.4	11.13	8.32	8.92
Jan 1981	263.3	11.27	8.51	8.90
Feb 1981	263.7	11.43	8.59	9.00
Mar 1981	265.5	11.47	8.63	9.17
Apr 1981	267.9	11.73	8.76	9.33
May 1981	270.0R	11.99R	8.90	9.49
Jun 1981	272.3R	12.03R	9.16	9.57
Jul 1981	274.3R	12.07R	9.20	9.62
Aug 1981	276.0	12.19R	9.15R	9.63R
Sep 1981	276.7R	12.41P	9.22P	9.77P
Oct 1981	278.6R	12.75P	9.34P	9.95P
Nov 1981	278.2P	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.
[2]Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.
[3]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.
[4]Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

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STATISTICAL DATA

REPUBLIC OF SOUTH AFRICA STATISTICS

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Wholesale Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[5]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[5]
Annual Avg. 1970[3]	7.34	100.3[4]	—	655,346	399,164
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3,6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3,6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3,6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Sep 1980	36.19	182.8	199.8	710,889	204,761
Oct 1980	—	186.3	203.1	720,246	204,602
Nov 1980	—	187.8	205.6	716,797	208,345
Dec 1980	37.69	189.9	206.5	705,087	211,829
Jan 1981	—	191.0	207.2	729,575	219,969
Feb 1981	—	193.8	209.8	725,647	210,275
Mar 1981	39.26	195.2	209.9	705,010	210,151
Apr 1981	—	196.4	211.6	719,674	217,124
May 1981	—	197.7	213.2	726,869	219,880
Jun 1981	40.41	200.0	215.3	728,506	237,049
Jul 1981	—	204.6	218.4	735,839	249,080
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6R	724,604R	251,502R
Oct 1981	—	216.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	—	—
Dec 1981	44.52	216.3	—	—	—

[1]Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly.
[2]Republic of South Africa Department of Statistics, Pretoria: "Government Gazette: Consumer Price Index for Urban Areas."
[3]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.
[4]April 1970 = 100.00.
[5]Bulletin of Statistics, Department of Statistics, Pretoria.
[6]Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

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NUEXCO

1981 INDEX

Report No.	Topic	Page No.
149	Apparent Future Consumption — Forecast Improvements in Fuel Utilization	1
	Australia — 1980 Production Review	2
	Canada — 1980 Production Review	3
	Japan — Ten Year Energy Plan	3
	Topical Essay — World Captive Uranium Production	6
	Commentary — The Halbouty Report	10
	Raw Materials — Uranium in Alkaline Rocks	12
150	1980 Uranium Production	1
	1980 Nuclear Power Generation	2
	1980 Transactions	2
	Australia — Energy Resources of Australia	4
	Comecon Nuclear Capacity	4
	Conversion, Emergence of Secondary Market	6
	Commentary — Government and the US Uranium Industry	8
	Raw Materials — South Texas District. Part I	10
151	Uranium Disputes	1
	Canada — Key Lake Board of Inquiry Report	3
	US — Reactor Licensing Delays	4
	Topical Essay — Demand vs. Apparent Future Consumption, US	7
	Raw Materials — South Texas District, Part II (corrected copy was distributed with Report 152)	9
152	Uranium Disputes, Update	1
	Canada — Key Lake Board of Inquiry Report Findings	3
	Japan — Installed Nuclear Capacity Goal	4
	US — Uranium Production Cutbacks	4
	Commentary — President Reagan and Nuclear Power	7
	Raw Materials — World Uranium Resources	10
153	European Waste Disposal	1
	South Africa -- First Quarter Uranium Production	3
	Australia — Seamen's Union Ban on Uranium Export	3
	Japan — Tsuruga Station Incident	4
	US — Uranium Disputes, Update	5
	Topical Essay — Demand vs. Apparent Future Consumption, Non-US	7
	Topical Essay — Japan's Nuclear Growth, Hope vs. Reality	9
	Raw Materials — Australian Uranium Deposits	11
154	South Africa Uranium Resources Reassessment	1
	Japan — Uranium Supply Commitments	2
	US — New Mexico Severance Tax	3
	— US DOE Electricity Generation Figures	3
	— Westinghouse Settlements Summary	3
	Topical Essay — Demand vs. Apparent Future Consumption, Observations	6
	Commentary — The Evolving Uranium Market	8
	Raw Materials — Great Divide Basin, Wyoming	10

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155	Australia — Government Pricing Policy	1
	Canada — Saskatchewan Export Contracts	2
	Philippines — Uranium Procurement Activities	3
	US — DOE Enrichment Contracts	3
	— Uranium Production Cutbacks	4
	Topical Essay — Unconventional Transactions: Part I, Inventory Upgrading	7
	Commentary — France and Nuclear Power	10
	Raw Materials — Uranium Resources Reevaluated	11
156	South Africa — Second Quarter Uranium Production	1
	Australia — Pancontinental's Jabiluka Project	1
	Japan — Energy Policy Recommendations	2
	— Comparative Costs of Electric Generation	3
	US — Uranium Production Developments	3
	Topical Essay — Unconventional Transactions: Part II, Options	6
	Essay — Nuclear Agreement Update	8
	Raw Materials — Spanish Nuclear Program, Part I	11
157	Canada — Saskatchewan Royalties	1
	US — Nuclear Electric Generating Capacity	4
	— Apparent Future Consumption	5
	Topical Essay — Unconventional Transactions: Part III, Barters	8
	Essay — NPT Update	10
	Raw Materials — Spanish Nuclear Program, Part II	13
158	Uranium Production Forecast	1
	Australia — Euratom Bilateral Agreement	3
	— Uranium Enrichment Group of Australia	3
	Canada — Saskatchewan Sales of Uranium	4
	France — Socialist Party Energy Program	4
	Japan — Nuclear Power Program	4
	US — Senate Subcommittee Hearing, Uranium Industry Viability	5
	Topical Essay — The Bridge Transaction	8
	Raw Materials — Key Lake Project, Part I	10
159	South Africa — Third Quarter Uranium Production	2
	Australia — Unions' Ban on Uranium Export	2
	— Honeymoon Project	3
	Canada — Ontario Hydro Renegotiates Contracts	3
	Italy — New Energy Plan	4
	France — Energy Debate	4
	— Framatome and Cogema Link-up	5
	Switzerland — Kaiseraugst Project	5
	Japan-Australia Joint Enrichment Effort	6
	US — Reagan Nuclear Power Statement	7
	— Utility Inventory Distribution	8
	— DOE SWU Price Increase	8
	— Forecast of Apparent Future Consumption	10
	Supply and Demand Analysis	13
	Essay — The Exchange Value: What It Is and What It Is Not	17
	Raw Materials — Key Lake Project, Part II	19

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NUEXCO

160	South Africa — Obtains Enriched Uranium	1
	Australia — Injunction Against Uranium Ban	1
	— Ranger Project Opened	2
	Canada — Beaverlodge Facility Closing	2
	France — Framatome Restructured	2
	Colombia — Uranium Exploration	3
	US — Inventory Distribution	4
	Essay — The Impact of Reactor Cancellations	9
	Commentary — Dilemmas of Nuclear Power	12
	Raw Materials — Key Lake Project, Part III	16
161	1981 IN REVIEW	
	Pricing	1
	Supply and Demand	2
	Monthly Supply and Demand	3
	Transactions	4
	1981 Uranium Production or Yearend Status of Nuclear Program for:	
	— South Africa	9
	— Namibia	9
	— Australia	9
	— Canada	10
	— France	11
	— United Kingdom	12
	— Spain	12
	— Portugal	13
	— Switzerland	13
	— Italy	13
	— Netherlands	13
	— Finland	13
	— Sweden	13
	— West Germany	13
	— Japan	14
	— Philippines	14
	— Korea	14
	— Taiwan	14
	United States	
	— WPPSS Sues Western Nuclear	14
	— 1981 Uranium Production	14
	— Nuclear Power Plant Status	16
	— Nuclear Plant Cancellations (1979-1981)	17
	— Nuclear Plants Under Construction	18, 19
	Raw Materials — Summary of 1981 US Uranium Activities	24
	Historical Transaction Value Tabulated	31

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EXECUTIVE SUMMARY
NUEXCO REPORT 162

Exchange Value Decreases 50 Cents to $23.00

The **Exchange Value** as of January 31, 1982 is $23.00 per pound U_3O_8. The decline of 50 cents from the $23.50 level of the past six months reflects recent and pending transactions at lower prices and an increase in the amount of material available for sale. Buyers are few and they have become more selective, sensing a weakening market.

Near Term Supply Increases

Additional sellers entered the spot and near-term markets during January, offering substantial amounts of material. Material available for sale in the zero to one year time frame totals 10.1 million pounds U_3O_8. Uranium demand in the same time period totals four million pounds U_3O_8. Material offered by inventory holders represents 60 percent of the total material for sale in the spot and near term. Material being sought by non-primary users represents two-thirds of the total material under inquiries to purchase in the same time period.

Transaction Value $24.00, Unchanged

The **Transaction Value** as of January 31, 1982 is $24.00 per pound U_3O_8 for the second consecutive month. Twenty transactions totaling 2.8 million pounds U_3O_8 and covering a period of five months are included.

Conversion Value Remains at $1.20

The secondary market for conversion services was quiet during January. The **Conversion Value** held steady at $1.20 per pound U as UF_6. One secondary market conversion transaction is reported.

1981 Transactions Tabulated

The totals of all transactions reported by Nuexco during 1981 are presented, with a breakdown by delivery year. A weighted average of prices for 1981 transactions is discussed.

UEGA Activities Highlighted

The Uranium Enrichment Group of Australia is currently studying various enrichment technologies with a decision expected in a few months. A full feasibility study will follow the selection.

Australia and Japan Initial Bilateral

After three and one-half years of negotiations, officials of the Japanese and Australian governments initialled a bilateral safeguards agreement. However, there are conflicting reports as to the content of the agreement.

1981 World Production Totals

1981 world uranium production was essentially the same as in 1980. The distribution changed somewhat; Canadian and Australian output increased enough to effect a 14 percent drop in US production.

Quantitative Factors Affecting Uranium Prices Reviewed

During the past year, Nuexco published a series of analyses discussing quantitative factors which affect uranium prices. A review of some of the analyses is presented in the *Market Analysis* section.

Long-term Contracting Discussed

This month's *Essay* analyzes the problems of pricing long-term contracts and discusses the various methods used and their potential drawbacks.

Plateau Resources' Shootaring Canyon Project Presented

The *Raw Materials* section focuses on the development of the Shootaring Canyon project, now scheduled for uranium production later this year.

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